

**Section 7.3**                      **Trigonometric Substitution**

$$a^2 - x^2 \Rightarrow x = a \sin \theta \Rightarrow dx = a \cos \theta d\theta$$

$$a^2 + x^2 \Rightarrow x = a \tan \theta \Rightarrow dx = a \sec^2 \theta d\theta$$

$$x^2 - a^2 \Rightarrow x = a \sec \theta \Rightarrow dx = a \sec \theta \tan \theta d\theta$$

Ex: Evaluate the following:

a)  $\int \frac{\sqrt{9-x^2}}{x^2} dx$

b)  $\int \frac{t^5}{\sqrt{t^2+2}} dt$

c)  $\int \frac{dx}{x^2 \sqrt{16x^2 - 9}}$

d)  $\int \sqrt{5 + 4x - x^2} dx$

c) 
$$\int \frac{3x-5}{(21+12x-9x^2)^{3/2}} dx$$

f) 
$$\int \frac{dx}{\sqrt{x^2-6x+13}}$$

g) 
$$\int \frac{2x+4}{[-4x^2-12x-5]^{3/2}} dx$$

h) 
$$\int \frac{2x+3}{(4x^2-4x-3)^{5/2}} dx$$